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John A. Miller
Warn, Burgess & Hoffmann, P.C.
P.O. Box 70098
Rochester Hills, MI 48307

EXAMINER	
GAKH, YELENA G	
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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Application Number: 10/628,991
Filing Date: July 29, 2003
Appellant(s): CHOU, MAU-SONG

John A. Miller
For Appellant

EXAMINER'S ANSWER

This is in response to the supplemental appeal brief filed 08/03/07 appealing from the Office action mailed 11/03/06.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. Rejection of claims 1-3, 5-12, 14 and 21-26 under second paragraph of 35 U.S.C. 112. Rejection of claims 1-3, 5-7 and 21-23 under 35 U.S.C. 103(a) as being obvious over Thériault et al. and claims 8-9, 11-12, 14 and 24-26 as being obvious over Samuels in view of Bernstein.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,496,839	BERNSTEIN et al.	01-1985
5373160	TAYLOR	12-1994
20040211900	JOHNSON	10-2004
4710887	HO	12-1987
4568190	CARLON et al.	02-1986

Childers et al. "Multi-pollutant concentration measurements around a concentrated swine production facility using open-path FTIR spectrometry", Atmospheric Environment, 2001, v. 35, pp. 1923-1936

Samuels et al. "Infrared spectral study of aerosolized ovabumin and aerosolized *Bacillus subtillis* and *Bacillus thudngiensis* spores", Proceedings of Fifth Joint Conference on Standoff Detection for Chemical and Biological Defense", 24-28 September 2001, Williamsburg, Virginia.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-7 and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Bernstein et al. (US 4,496,839, IDS).

Bernstein indicates: "disclosed is a system and method for remote detection and identification of unknown chemical species in gaseous, **aerosol**, and liquid states. *A pulsed infrared laser is directed at an unknown chemical mass, which absorbs energy at the laser wavelength* [which means that IR laser irradiating the aerosol cloud is heating the cloud relative to the background, *Examiner*]. Due to molecular energy transfer processes the absorbed laser

energy can be re-emitted in one or more wavelength regions nonresonant with the laser wavelength. The re-emitted energy is detected for a period of time which is comparable to or less than the characteristic time for the absorbed radiative energy to be dissipated as heat. The nonresonant **infrared emission spectrum** of the unknown chemical species is detected with several infrared detectors. The identity of the unknown species, as well as its range and concentration, may be established by comparison of its spectrum to that for known species" (Abstract). A radiation source is a "**CO_2 infrared laser whose output at wavelength λ_0 =9.4 m**, is directed to steering expansion mirror 14 and then to steering collimating mirror 16 in the transmitting optics, from which it is directed to the unknown chemical species 18" (col. 2, lines 67-68, col. 3, lines 1-4).

Claims 1-3, 5-7 and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Taylor (US 5,373,160).

Taylor discloses: "as shown in FIG. 1, the hazardous air pollutants monitor 35 according to the invention comprises four main components. These are **a CO_2 laser 22**, a nonlinear crystal or doubler 42, a receiver 44 including an acousto-optic tunable filter 46, and a computer 48 for analyzing collected data and for controlling system operation. Preferably, these elements are coupled optically using **a beam expander 52**, a gimballed turning mirror 54, and a **directable receiving telescope 56**. The laser 22 and beam expander 52 direct illumination along the beam path 80, and are mounted commonly with the telescope 56 to illuminate and view along a common path between the measuring system 35 and a remote topographic target. The telescope 56 focuses light from the sample on at least one, and preferably two detectors 62, 64. The detectors, which may be point detectors, line arrays, or focal plane arrays, can include a **7-14 μm detector 62** and a **3.5-7 μm detector 64**, which are operated selectively in conjunction with control of the illumination wavelength selected by the laser output means, generally designated 76. The detectors 62, 64 are controllably coupled to an electronic controller, preferably provided as a function of **computer 48**, that sequences system operation and analyzes the collected data to decode the measurement results" (col. 6, lines 15-39). The CO_2 laser irradiates the sample with an irradiation of an optical wavelength from 9.2 to 10.8 μm (col. 5, lines 66-68). "The processor analyzes the light levels as a function of wavelength to discriminate for the presence of selected

gases by determining a characteristic pattern of light absorption and *light emission* by the gases" (col. 4, lines 60-63).

Claims 1-3, 5-7 and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Childers et al. (Atmos. Env., 2001) as evidenced by Taylor.

Childers teaches "multi-pollutant concentration measurements around a concentrated swine production facility using open-path FTIR spectrometry" (Title). "Spectral data were collected with an AIL Systems, Inc. RAM 2000 Remote Air Monitoring System. In this monostatic OP/FTIR monitor, the spectrometer module contains an IR source, detector, interferometer, transmitting/receiving telescope, external beamsplitter, and associated electronics". While Childers does not specify the specific nature of the IR source, appealed claims 1 and 21 merely require a radiation source. Furthermore, CO_2 laser is one of a limited number of IR sources, if not an exclusive source, for remote emission IR detection systems, such as OP/FTIR systems, as evidenced by Taylor. The CO_2 lasers irradiate the sample with frequencies, which are resonant to the vibration frequencies of a plurality of molecules.

Claims 1-3, 5 and 21-23 are rejected under 35 U.S.C. 102(e) as being anticipated by the prior art disclosed in Johnson (US 2004/0211900) as evidenced by Taylor.

In **Background of the Invention** Johnson discloses various FTIR spectroscopic systems for active and passive remote analysis of gases in atmosphere, with active systems comprising an active source of IR radiation, a telescope for collimating the radiation, and IR detection system with necessity of co-alignment of the IR sender and receiver telescopes (col. 1, and 2, paragraphs [003] and [004]). Although Johnson does not specify the nature of the IR radiation, specifically CO_2 laser as active sources, claims 1 and 21 merely recite a radiation source. Furthermore, CO_2 laser is one of a limited number of IR sources, if not an exclusive source, for remote emission IR detection systems, such as disclosed by Johnson, as evidenced by Taylor. The principle of active FTIR spectroscopy of **the prior art** disclosed Johnson is **heating the sample** and detecting its IR spectrum vs. colder background, see page 1, [0003], [0004], which means that any radiation source will heat the sample by exciting its vibration levels, followed by detecting emission spectrum of the sample components.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 8-9, 11-12, 14 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernstein in view of Samuels.

The teaching of Bernstein's prior art is presented above.

Bernstein does not teach the system for local detection in a laboratory chamber.

Samuels discloses a system for "infrared spectral study of aerosolized ovalbumin and aerosolized *Bacillus subtillis* and *Bacillus thuringiensis* spores" (Title), comprising a rectangular aerosol chamber with a ZnSe window on one side with MIDAC FTIR spectroradiometer and a blackbody radiation source for heating the sample.

It would have been obvious for any person of ordinary skill in the art to modify Bernstein's system for remote detection of the aerosols in light of Samuels's teaching for local detection in the reaction chamber with Bernstein's set-up of heating the aerosol cloud with CO_2 laser and detecting the emission from the excited aerosol molecules, because Samuel discloses the efficiency of similar detection in laboratory conditions.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bernstein in view of Samuels, as applied to claims 8-9, 11-12 and 24-26 above, and further in view of Ho (US 4,710,887) or Carlon et al. (US 4,568,190).

Bernstein in view of Samuels do not specifically disclose a fan in the chamber.

Ho discloses a small electric fan 20 housed with the chamber 10 to distribute the aerosol within the chamber (Figure 1, col. 2, lines 7-9) and Carlon discloses a rotary gab 20 for homogenous spreading of the aerosol particles in the chamber (Figure 1).

It would have been obvious for any person of ordinary skill in the art to introduce the fan disclosed by Ho or Carlon in Bernstein-Samuels' system for more homogenous distribution of the aerosol particles in the chamber.

(10) Response to Argument

Since the rejection under second paragraph of 35 U.S.C. 112 is withdrawn, the examiner will not respond to the Appellant's arguments regarding this rejection.

Rejection of claims 1-3, 5-7 and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Bernstein. The Appellant's arguments are directed toward operation of the system, rather than its structure. Even if the Appellant's arguments were persuasive regarding the operation of the system, Bernstein does teach all the elements of the system recited in claims 1-3, 5-7 and 21-23: the radiation source (claims 1, 21) being a CO_2 laser (claims 5 and 23), which heats the cloud (claims 1, 21) and an IR spectrometer (claims 2-3 and 22) responsive to emission from the chemicals in the cloud (claims 1 and 21) (see Abstract and col. 2, lines 67-68, col. 3, lines 1-4). Moreover, it is not only the structure of Bernstein's system, but also its operation is exactly the same as the one disclosed by the Appellant: CO_2 laser irradiates the cloud with a set of frequencies with the following redistribution of the thermal energy and emitting the energy from the chemicals in the cloud, which is detected with IR spectrometer. The examiner believes that the Appellant misinterprets Bernstein's disclosure when provides the following statement: "[i]n Bernstein, the laser radiation causes an elevated vibrational temperature of the atoms of the target molecules that is above the bulk gas temperature *of the cloud* " [examiner's italic]. The exact citation from Bernstein is the following: "[b]ecause of the large number of vibrational modes in a big molecule, within 10^{-9} seconds after laser photon absorption the excited molecule can be characterized by a vibrational temperature which is elevated significantly above the bulk gas temperature" (see Bernstein, col. 3, lines 54-59). Thus, Bernstein discerns between big target molecules under analysis and bulk gas, which obviously *is the background* for the cloud of the target molecules, rather than the gas of the cloud. It does not seem probable to have the temperature of the bulk gas lower than the temperature of all its components, if the bulk gas were in fact the gas of the cloud. Thus, Bernstein is heating the aerosol cloud versus the background, exactly in accordance with the operation of claimed structure.

Rejection of claims 1-3, 5-7 and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Taylor.

The Appellant's arguments are again directed toward the function of the system, rather than it structure. Taylor discloses exactly the same system as recited in the claims indicated above with all the functions of the system inherent for its structure. Since there is no difference

between the structural elements of Taylor's system and the one recited in the claims indicated above, both systems are capable of the same functions.

The same is true for the arguments related to rejections over Childers and Johnson's prior art as evidenced by Taylor. The structural elements of Childers' and Johnson's prior art systems evidenced by Taylor are equivalent to those of the indicated claims and therefore are capable of the same function.

Regarding the remaining obviousness rejections, Bernstein discloses the same structure as the one recited in claims 1-3, 5-7 and 21-23, and Samuels discloses a similar system, which uses a different radiation source, adapted for laboratory experiments. It would have been obvious for any person of ordinary skill in the art to adapt Bernstein's system to laboratory conditions the way it is taught by Samuels for the research purposes.

As for the rejection of claim 10, the structural limitation of claim 10 is a fan in the chamber, which is disclosed by Ho and Carlon. Fan disclosed by Ho and Carlon is capable of agitating a powder into the aerosol.

In conclusion, the Appellant's arguments are based on describing the function and operation of the system recited in the pending claims, which are not relevant to the claimed subject matter. The primary references disclose the same structural elements of the system as those recited in most of the pending claims, with secondary references curing deficiencies of the primary references.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Yelena G. Gakh, Ph.D.

/Yelena G. Gakh/

Conferees:

Jill A. Warden

JillWarden

Romulo H. Delmendo

/Romulo H. Delmendo/